NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

RESIDUE AND TILLAGE MANAGEMENT NO TILL/STRIP TILL/DIRECT SEED

(Ac.)

CODE 329

DEFINITION

Managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities to only those necessary to place nutrients, condition residue and plant crops.

PURPOSE

- Reduce sheet and rill erosion.
- Improve soil organic matter content.
- Reduce CO_2 losses from the soil.
- Increase plant-available moisture.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland and other land where crops are planted.

This practice includes planting methods commonly referred to as no-till, strip till, direct seed, zero till, slot till or zone till. Approved implements are: no-till and strip-till planters; certain drills and air seeders; strip-type fertilizer and manure injectors and applicators; in-row chisels; and similar implements that only disturb strips and slots. All others are considered to be full-width or capable of full disturbance and therefore not compatible.

CRITERIA

General Criteria Applicable to All Purposes

All residues shall be uniformly distributed over the entire field.

An evaluation of the cropping system using the current approved soil conditioning index shall not be less than a positive 0.4.

No full-width tillage shall be performed regardless of the depth of the tillage operation.

The annual Soil Tillage Intensity Rating (STIR) value for all soil-disturbing activities shall be no greater than 30.

Additional Criteria to Reduce Sheet and Rill Erosion

The amount of randomly distributed surface residue needed and the amount of surface soil disturbance allowed to reduce erosion to the soil loss tolerance (T) or any other planned soil loss objective shall be determined using the current approved water erosion prediction technology. Calculations shall account for the effects of other practices in the management system. Partial removal of residue by means such as baling or grazing, shall be limited to retain a minimum of 40 percent residue.

Additional Criteria to Improve Soil Condition

An evaluation of the cropping system using the current approved soil conditioning index procedure shall result in a soil conditioning index of greater than 0.5.

Erosion shall not exceed the soil loss tolerance (T).

A minimum of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface.

Additional Criteria to Reduce CO_2 Loss from the Soil

The annual Soil Tillage Intensity Rating (STIR) value for all soil-disturbing activities shall be no more than 20.

An evaluation of the cropping system using the current approved soil conditioning index procedure shall result in soil conditioning index of .5 or greater.

Additional Criteria to Increase Plant-available Moisture

Reducing Evaporation from the Soil Surface. The annual Soil Tillage Intensity Rating (STIR) value for all soil-disturbing activities in the cropping system shall be no more than 20.

A minimum of 50 percent residue cover shall be maintained throughout the year. Residue shall be evenly distributed and maintained on the soil surface.

Additional Criteria to Provide Food and Cover for Wildlife

The time that residue is present, the amount and orientation of residue and the height of stubble needed to provide adequate food and cover for the target species shall be determined using the WV Wildlife Habitat Evaluation Technique.

GENERAL CONSIDERATIONS

Removing of crop residue by baling or grazing, can reduce surface residue levels. If significant crop residues are removed from row crops, they should be replaced with cover crops planted no later than October 15.

Production of adequate amounts of crop residues necessary to achieve the purposes of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacing.

Using no till/strip till/direct seed for all crops in the rotation or cropping system can enhance the positive effects of this practice by:

- increasing the rate of soil organic matter accumulation.
- keeping soil in a consolidated condition, which provides additional resistance to sheet and rill erosion.
- sequestering more carbon in the soil.
- forming root channels and other near-surface voids that increase infiltration.

A field border planted to permanent vegetation can:

- allow unobstructed turning for equipment
- eliminate unproductive end rows
- provide food and escape cover for wildlife
- provide travel lanes for farming operations.

Increasing Soil Organic Matter Level and Reducing CO_2 Loss

CO_2 loss is directly related to the volume of soil disturbed, the intensity of the disturbance and the soil moisture content and soil temperature at the time the disturbance occurs. The following guidelines can make this practice more effective:

- Shallow soil disturbance (1-3 inches) releases less CO_2 than deeper operations.
- When deep soil disturbance is performed, such as by subsoiling or fertilizer injection, make sure the vertical slot created by these implements is closed at the surface.
- Planting with a single disk opener no-till drill will release less CO_2 than planting with a wide-point hoe/chisel opener air seeder drill.
- Soil disturbance that occurs when soil temperatures are below 50° F will release less CO_2 than operations done when the soil is warmer.

Managing Soil Moisture

Performing all field operations on the contour will slow overland flow and allow more opportunity for infiltration.

Wildlife Food and Cover

The amount or percent residue shall be determined using the most recent Wildlife Habitat Evaluation Technique (WVWHET) for the appropriate species; or as directed by the

State Biologist or West Virginia Division of Natural Resources.

Leaving rows of unharvested crop standing at intervals across the field or adjacent to permanent cover may enhance the value of residues for wildlife food and cover.

If necessary, relevant and feasible**,** avoid disturbing standing stubble or heavy residue during the nesting season for ground-nesting species (March 15 – July 15).

PLANS AND SPECIFICATIONS

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria and Considerations described in this standard. Specifications shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation. Specifications will include the following:

1. Identify the resource concern to be treated.
2. Ensure that the field location, acreage, crop rotation, tillage sequence, and percent residue needed to address the identified resource concern(s) are recorded as needed in the conservation plan.
3. Types of tillage implements used.
4. Soil loss calculations if needed.
5. Soil Conditioning Index (SCI) documentation.
6. Soil Tillage Index Rating (STIR) documentation.

OPERATION AND MAINTENANCE

Proper adjustments, operation, and maintenance of equipment is essential for successful implementation of this practice.

REFERENCES

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